PowerEdge M910

Technical Guide

The M910 is ideal for the demanding applications at the core of most data centers, such as large databases, virtualization and messaging infrastructure.

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1 Product Comparison

1.1 Overview

The Dell™ PowerEdge™ M-Series blade servers are designed to help cut operating expenses through energy efficiency, scalability, product flexibility, and efficient use of data center space.

The PowerEdge M910 provides significant performance and reliability in a scalable, full-height, four-socket blade server, allowing the deployment of large Enterprise-class applications as well as the ability to support heavy virtualization or workload consolidation in maximum density.

When combined with Dell's world-class storage, management, and support offerings, the result is a total enterprise solution that can help you optimize your IT environment and expenses.

Powerful

The PowerEdge M910 was designed to meet the needs of nearly any IT infrastructure or environment. Built with powerful Intel® Xeon® processor 7500 series and advanced systems management capabilities, the M910 is ideal for the demanding applications at the core of most data centers, such as large databases, virtualization, and messaging infrastructure.

Memory is a critical component for performance, especially for heavy virtualization and high-end database needs. With this in mind, the PowerEdge M910 was designed with 32 DIMM slots allowing up to 512GB of ECC DDR3 RAM to be supported, allowing these memory-intensive applications to have ample resources at their disposal.

Scalable

Many servers may be able to take advantage of the large memory support that modern architectures provide, but only Dell offers FlexMem Bridge technology, which allows the M910 to seamlessly scale from 4GB to 512GB of DDR3 RAM in either two-socket or four-socket configurations. This patent-pending technology allows Dell to deliver a unique platform that can seamlessly scale as customer and application needs dictate, without having to "rip and replace" existing server infrastructure.

In addition to allowing significant memory and processor scaling capabilities, the compact form-factor of Dell blades allows the ability to scale down the amount of space that your core application servers require. By utilizing the PowerEdge M910, you can deploy up to eight next generation 4-socket servers in only 10U of rack space, which is less than 1/3 of the space required using traditional 4U four-socket rack servers.

Reliable

With the PowerEdge M910, Dell continues its unrelenting focus on reliability. The PowerEdge M910 utilizes the redundant power, cooling, and networking infrastructure provided by the Dell M1000e Blade enclosure. The PowerEdge M910 itself incorporates improvements and features for maximum protection against potential downtime, such as the ability to support three fully redundant fabrics per blade and the inclusion of a dual-media redundant embedded hypervisor.

The PowerEdge M910 also utilizes Intel Xeon 7500 series processors which are designed to automatically monitor, report, and recover from hardware errors in order to maintain data integrity and keep mission-critical services online.

As with all Dell PowerEdge servers, the M910 is manufactured with our "one-touch" factory build process. This process is designed to ensure just one person is responsible for the entire server build, resulting in greater quality control. In addition, every fully configured Dell server is tested (and re-tested) before it leaves the factory to ensure maximum reliability.

Dell

Product documentation is available at support.dell.com. Information for the chassis can be found in the *PowerEdge M1000e Technical Guide*.

1.2 Product Comparison

Table 1. Product Comparisons

Feature /Spec	M910	M710	R810	R910
Processor	4 Socket Intel® Xeon® processor 6500 and 7500 series	2 Socket Intel® Xeon® processor 5500 series	4 Socket Intel® Xeon® processor 6500 and 7500 series	2 or4 Socket Intel® Xeon® 7500 Series
Front Side Bus	Four Intel® QuickPath Interconnect (QPI) links	Two Intel® QuickPath Interconnect (QPI) links	Four Intel® QuickPath Interconnect (QPI) links	Up to 6.4 GT/s Intel® QuickPath Interconnect (QPI) links
# Proc Sockets	2/4	2	2/4	2/4/6
Max # Cores per Socket	2S w/ up to16 cores 4S w/ up to 32 cores	Up to 4	2S w/ up to16 cores 4S w/ up to 32 cores	2S w/ up to16 cores 4S w/ up to 32 cores
L2/L3 Cache	L2 cache:1.5MB or 2MB L3 cache: 12MB, 18MB or 24MB (shared)	4MB and 8MB	L2 cache:1.5MB or 2MB L3 cache: 12MB, 18MB or 24MB (shared)	L3 cache: 12MB, 18MB or 24MB
Chipset	Intel® 7500	Intel® 5520	Intel® 7500	Intel® 7500
DIMMs	32 x DDR3	18 DDR3	32 x DDR3	64 x DDR3
Min/Max RAM	4GB-512GB	1GB-192GB	4GB-512GB	4GB – 1TB
Form Factor	Full Height Blade, Dual Slot	Full Height Blade, Dual Slot	2U Chassis, Rack	4U chassis, Rack
HD Bays (2.5" only)	2	4	6	16
HD Types	SAS/SSD	SAS/SSD	SAS/SSD	SAS/SSD
Integrated Standard HD Controller	H200/H700 (factory installed) and PERC6 as custom kit	H200/H700	H200/H700 PERC6	H200/H700
Optional HD Controller	H200/H700 Integrated controller (Battery backup for the H700 and PERC6 options only)	SAS6/iR PERC6i with RAID battery	PERC H800 or 6Gbps SAS	PERC H800 or 6Gbps SAS
Availability	Hot-swap hard drives Hot-swap redundant power and cooling ECC memory Single Device Data Correction (SDDC) Supports memory demand and patrol scrubbing High-availability failover cluster support	Hot-swap hard drives Hot-swap redundant power and cooling ECC memory Single Device Data Correction (SDDC) Supports memory demand and patrol scrubbing High-availability failover cluster support	Hot-swap hard drives Hot-swap redundant power and cooling ECC memory Single Device Data Correction (SDDC) Supports memory demand and patrol scrubbing High-availability failover cluster support	Hot-swap hard drives Hot-swap redundant power and cooling ECC memory Single Device Data Correction (SDDC) supports memory demand and patrol scrubbing High availability

Feature /Spec	M910	M710	R810	R910
Server Management	iDRAC6 Enterprise CMC (on M1000e)	iDRAC6 Enterprise (Both) standard CMC (on M1000e)	iDRAC6 Express iDRAC6 Enterprise Optional	iDRAC6 Express iDRAC6 Enterprise Optional
Mezz Slots	4 x8 PCIe Mezzanine Cards	1 x 4 and 3 x 8 PCIe Mezzanine Cards	6 x PCIe 5 x 8 1 x 4	7 PCIe Gen2 slots (2x4, 4 x8 + 1x16) Optional: 10 PCI e Gen2 (6x4, 4x8) Slot 5 is Gen1
NIC/LOM	4 x TOE – iSCSI offload	4 x TOE with optional iSCSI offload	4 x LOM (5709)	1GbE or 10Gp SFP+ embedded NIC options 4-port (4x1GbE) embedded NIC Broadcom 5709c Or 4-port (2x10gb SPF+ & 2x1GbE) Embedded NIC Broadcom 57711 + Broadcom 5709c
USB	3 x External USB 2.0 ports at front bezel 1 x Internal USB port	3 x External USB 2.0 ports at front bezel 1 x Internal USB port	2 ports in the front 4 ports in the rear	2 in the rear 2 in the front 1
SD Card	2 x Internal SD slot 1 for Persistent Storage 1 for Lifecycle controller on iDRAC (can also be configured as redundant SD cards - RIPS)	1 x Internal SD slot 1 for Persistent Storage 1 for Lifecycle controller on iDRAC	2 x Internal SD slot 1 for Persistent Storage 1 for Lifecycle controller on iDRAC	2 x Internal SD slot 1 for Persistent Storage 1 for Lifecycle controller on iDRAC
Power Supplies	See *PowerEdge M1000e Technical Guide*	See *PowerEdge M1000e Technical Guide*	2 x 1100W	4 x 750w (Energy Smart) Or 4 x 1100W (High output)
Fans	See *PowerEdge M1000e Technical Guide*	See *PowerEdge M1000e Technical Guide*	Redundant cooling	Redundant cooling
Chassis	See *PowerEdge M1000e Technical Guide*	See *PowerEdge M1000e Technical Guide*	Rack	Rack

2 New Technologies

2.1 Overview

The PowerEdge M910 server includes the following new features:

- Intel Xeon Processor 7500 Series (4s) and Intel Xeon Processor 6500 Series (2s) 4-, 6-, and 8-core processors
- Intel 7500 Chipset
- FlexMem Bridge
- IO Hub (IOH) with Intel® QuickPath Architecture
- DDR3 memory
- PCI Express® Generation 2
- Optional Redundant SD media for embedded hypervisor
- iDRAC6 Express

2.2 Detailed Information

2.2.1 Intel Xeon Processors

The processor features up to eight-core processing to with maximize performance (expected up to 3.8x performance improvements) and performance/watt and significant energy efficiency improvements for datacenter infrastructures and highly dense deployments. Additionally, the Intel Xeon processor 6500 and 7500 series features the Intel® 64 Architecture for flexibility in 64-bit and 32-bit applications and operating systems.

2.2.2 Intel 7500 Chipset

See Section 8 for detailed information in the Intel 7500 chipset.

2.2.3 FlexMem Bridge

The PowerEdge M910 also introduces a new, Dell patent-pending, technology which will allow flexibility in processor and memory scalability—FlexMem Bridge. The FlexMem Bridge allows the full amount of addressable DIMMs on 4-Socket systems with Intel Xeon processor 7500 and 6500 series to be accessed, even when only 2 of the processors are in place, in a completely passive solution (no active components).

2.2.4 IO Hub (IOH) with Intel QuickPath Architecture

The Intel QuickPath Architecture consists of serial point-to-point interconnects for the processors and the system IOH. The M910 has a total of eight QuickPath Interconnects (QPI) lines: six links connecting the processors and two links connection processors 1 and 2 with the IOH.

2.2.5 DDR3 Memory

The M910 uses DDR3 memory which provides a high-performance, high-speed memory interface capable of low latency response and high throughput. The M910 supports Registered ECC DDR3 DIMMs (RDIMMs).

The DDR3 memory interface consists of 8 Intel Scalable Memory Buffers (SMBs), each or which has two DDR3 memory channels. Each channel supports up to two RDIMMs for single/dual/quad rack. By limiting to two DIMMs per DDR channel, the system can support quad-rank DIMMs at 1067MHz.

2.2.6 PCI Express Generation 2

PCI Express is a serial point-to-point interconnect for I/O devices. PCIe Gen2 doubles the signaling bit rate of each lane from 2.5 Gb/s to 5 Gb/s. Each of the PCIe Gen2 ports is backwards-compatible with Gen1 transfer rates.

2.2.7 Internal Redundant SD Module

The Internal SD Module is dedicated for an SD Flash Card with embedded Hypervisor for virtualization. The SD Flash Card contains a bootable OS image for virtualized platforms. The persistent storage solution on the M910 allows for redundant SD cards.

2.2.8 iDRAC6 Express

The iDRAC6 Express feature set is a managed persistent storage space for server provisioning data. It consists of 1 GB flash and vFlash (an optional externally accessible SD card). vFlash offers the hot-swap portability and increased storage capacity benefits of SD while still being managed by the system.

3 System Information

3.1 Overview

The PowerEdge M910 is an innovative blade design that allows scaling from 2 to 4 sockets (no single or 3 socket support) based on a new generation of Intel four-socket enhanced processors, RAM, and management while still taking advantage of the M1000e chassis architecture. Along with the M1000e chassis, the PowerEdge M910 server leads the industry in high speed, redundant IO throughput and power efficiency with more RAM slots in the 2-socket space.

3.2 Product Features Summary

Table 2. Product Features

Feature	Dell™ PowerEdge™ M910
Processors	Up to Four Intel® Xeon® processor 7500 series Quad-, Six-, or Eight-Core; or, Up to Two Intel® Xeon® processor 6500 series Quad-, Six-, or Eight-Core
Chipset	Intel® 7500
Memory[1]	1GB/2GB/4GB/8GB/16GB ECC DDR3 Support for up to 512GBs using 32 x 16GB DIMMs
Drive Bays	Two 2.5” SAS/Solid State hot-swappable drives
Storage[1]	**Internal:** 2.5” 6Gbs SAS (15K): 73GB, 146GB 2.5” 6Gbs SAS (10K): 146GB, 300GB 2.5” 6Gbs SAS (7.2K): 500GB 2.5” SSD: 50GB, 100GB **External:** Dell™ EqualLogic™ PS Series Dell™ PowerVault™ MD Series & NX Series Dell/EMC CX Series, AX Series & NS Series
RAID Controller Options	PERC H200 Modular RAID Controller (6Gb/s) PERC H700 Modular RAID Controller (6Gb/s) with 512MB battery-backed cache; 512MB, 1GB Non-Volatile battery-backed cache
I/O Mezzanine Card Options	Fully populated mezzanine card slots and switch modules will yield 3 highly available, redundant I/O fabrics per blade. **1Gb & 10Gb Ethernet:** Broadcom® Dual-Port Gb Ethernet w/ TOE (BCM-5709S) Intel® Quad-Port Gb Ethernet Broadcom® Quad-Port Gb Ethernet (BCM-5709S)

[1] GB means 1 billion bytes and TB equals 1 trillion bytes; actual capacity varies with preloaded material and operating environment and will be less.

	Intel® Dual-Port 10Gb Ethernet Broadcom® Dual-Port 10Gb Ethernet (BCM-57711) 10Gb Enhanced Ethernet & Converged Network Adapters (CEE/DCB): Intel® Dual-Port 10Gb Enhanced Ethernet (FcoE Ready for Future Enablement) Emulex® Dual-Port Converged Network Adapter (OCM10102-F-M)—Supports CEE/DCB 10GbE + FCoE Qlogic® Dual-Port Converged Network Adapter (QME8142)—Supports CEE/DCB 10GbE + FCoE **Fibre Channel:** QLogic® Dual-Port FC8 Fibre Channel Host Bus Adapter (HBA) (QME2572) Emulex® Dual-Port FC8 Fibre Channel Host Bus Adapter (HBA) (LPe1205-M) **InfiniBand:** Mellanox® Dual-Port ConnectX™ Quad Data Rate (QDR) InfiniBand
Operating Systems	Microsoft® Windows® Essential Business Server 2008 Microsoft® Windows Server® 2008 SP2, x86/x64 (x64 includes Hyper-V™) Microsoft® Windows Server® 2008 R2, x86/x64 (includes Hyper-V™ v2) Microsoft® Windows® HPC Server 2008 Novell® SUSE® Linux® Enterprise Server Red Hat® Enterprise Linux® Sun® Solaris™ For more information on the specific versions and additions, visit www.dell.com/OSsupport. **Virtualization Options:** Citrix® XenServer™ Microsoft® Hyper-V™ via Microsoft® Windows Server® 2008 VMware® vSphere™ 4.1 (including VMware ESX® 4.1 or VMware ESXi™ 4.1) For more information on the specific versions and additions, visit the Operating System Support Matrix for Dell PowerEdge Systems on Dell.com.
Featured Database Applications	Microsoft® SQL Server® solutions (see Dell.com/SQL) Oracle® database solutions (see Dell.com/Oracle)
Power Supply	Supplied by Dell™ M1000e Blade Chassis
Video	Matrox® G200eW w/ 8MB memory
Systems Management	BMC, IPMI2.0 compliant Dell™ OpenManage™ featuring Dell Management Console Unified Server Configurator Lifecycle Controller iDRAC6 Enterprise with optional vFlash Remote Management: iDRAC6 Enterprise with optional vFlash
Embedded Hypervisor	Optional Dual-Media Redundant Hypervisor

4 Mechanical

4.1 Overview

The M910 is a full height blade server that requires an M1000e chassis (shown in Figure 1) to operate.

Figure 1. **M1000e**

It occupies 2 slots in the M1000e rack chassis for a maximum of 8 blades in one M1000e chassis. It can be mixed with other existing Dell blades and is designed to mix with possible future half-height-double-wide and full-height-double-wide blades. Some highlights are:

- Support for RAID
- Support for persistent storage (internal USB connector and two external SD card slots)

Refer to the *PowerEdge M1000e Technical Guide* for information on fans, power and power supply, racks, security, and other chassis information.

4.2 Module Dimensions and Weight

Height: 38.5cm (15.2in)

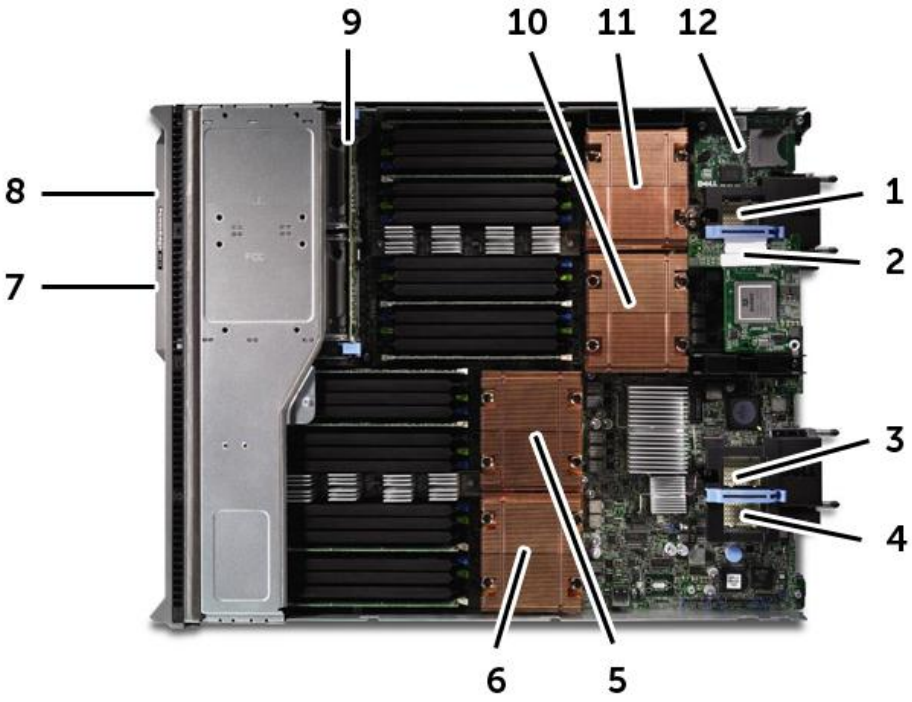
Width: 5cm (2in)

Depth: 48.6cm (19.2in)

Weight: 13.1kg (29lb) maximum configuration

4.3 Internal Module

A view of the internal module is shown in Figure 2. See Opening and Closing the Blade in the *Dell PowerEdge Modular Systems Hardware Owner's Manual* for more information.



1) Optional Mezzanine Card 1 - Fabric C
2) Optional Mezzanine Card 2 - Fabric B
3) Optional Mezzanine Card 3 - Fabric C
4) Optional Mezzanine Card 4 - Fabric B
5) Processor CPU2 and Heat Sink
6) Processor CPU4 and Heat Sink
7) Hard Drive 1
8) Hard Drive 0
9) Hard Drive Backplane
10) Processor CPU1 and Heat Sink
11) Processor CPU3 and Heat Sink
12) iDRAC Enterprise Card

Figure 2. Internal Module View

4.4 Security

Configurable client IP address range for clients connecting to iDRAC6.

4.5 Cover Latch

The blade module includes a latch for the cover. See Opening and Closing the Blade in the *Dell PowerEdge Modular Systems Hardware Owner's Manual* for more information.

4.6 TPM (Trusted Platform Module)

The TPM is used to generate/store keys, protect/authenticate passwords, and create/store digital certificates. TPM can also be used to enable the BitLocker™ hard drive encryption feature in Windows Server 2008. TPM is enabled through a BIOS option and uses HMAC-SHA1-160 for binding. TCM is available in China.

4.7 Power Off Security

Through the CMC, the front USB's and power button can be disabled so as to not allow any control of the system from the front of the blade.

4.8 USB Key

The M910 supports the following USB devices:

- DVD (bootable; requires two USB ports)
- USB Key (bootable)
- Keyboard (only one USB keyboard is supported)
- Mouse (only one USB mouse is supported)

4.9 Battery

A replaceable coin cell CR2032 3V battery is mounted on the planar to provide backup power for the Real-Time Clock and CMOS RAM on the ICH9 chip.

4.10 Field Replaceable Units (FRU)

The planar contains a serial EEPROM to contain FRU information including Dell part number, part revision level, and serial number.

5 Operating, Thermal, and Acoustic

5.1 Overview of Operating and Storage Conditions

Table 3. Operating and Storage Conditions

Temperature	
Operating	10° to 35° C (50° to 95° F) with a maximum temperature gradation of 10o C per hour NOTE: For altitudes above 2950 feet, the maximum operating temperature is derated 1°F/500ft
Storage	–40° to 65°C (–40° to 149°F) with a maximum temperature gradation of 20°C per hour
Relative Humidity	
Operating	20% to 80% (noncondensing) with a maximum humidity gradation of 10% per hour
Storage	5% to 95% (noncondensing) with a maximum humidity gradation of 10% per hour
Maximum Vibration	
Operating	0.26 Grms at 5–350 Hz in operational orientations
Storage	1.54 Grms at 10–250 Hz in all orientations
Maximum Shock	
Operating	Half sine shock in all operational orientations of 31 G +/- 5% with a pulse duration of 2.6 ms +/- 10%
Storage	Half sine shock on all six sides of 71 G +/– 5% with a pulse duration of 2 ms +/– 10%
Altitude	
Operating	-15.2m to 3048 m (-50 to 10,000 ft) Note: For altitudes above 2950 ft, the maximum temperature is derated 1o F/550 ft
Storage	-16 to 10,600 m (-50 to 35,000 ft)

5.2 Acoustics

Adherence to Dell's high sound quality standards. Sound quality is different from sound power level and sound pressure level in that it describes how humans respond to annoyances in sound, like whistles, hums, etc. One of the sound quality metrics in the Dell specification is prominence ratio of a tone, and this is listed in the table below.

Acoustical Performance of Typical Configuration: When installed in the M1000e blade chassis, typical configuration[2] (shown in Table 4of M910 blade results in the following idle acoustical performance in 23±2° C ambient:

LwA-UL[3] = 8.1 bels and no prominent tones[4]

Table 4. Typical Configuration Used in Testing

Chassis	Description	Quantity
Blade	M910	4
Slots populated	1, 2, 3, 4	
Power supply	2300-W	6
Blanks	Blank modules	8
System Fans	M1000e fan	9
Blade Internals	**Description**	**Quantity**
CPU	Intel® Xeon® processor 7500 series 105W	2
DIMM	4 GB DDR3	24
Mezz Cards	Dual-port Broadcom® 5709	4
HDD	SAS 2.5" 146 GB, 10 krpm	2

[2] *Typical configuration means projected average quantity, type, capacity, speed, etc., of components. Configuration for which data reported is listed in Table 4.*

[3] *LwA - UL is the upper limit sound power level (LwA) calculated per section 4.4.2 of ISO 9296 (1988) and measured in accordance to ISO 7779 (1999).*

[4] *Prominent tone: Criteria of D.5 and D.8 of ECMA-74 9th ed. (2005) are followed to determine if discrete tones are prominent. The system is placed in a rack with its bottom at **75 cm** from the floor. The acoustical transducer is at front bystander position, ref ISO7779 (1999) Section 8.6.2.*

5.3 Thermal

The M910 thermal solution includes:

- Optimized airflow impedance for individual blade and chassis level airflow balancing
- Custom air baffling directs airflow through the components to maintain proper cooling
- Custom-designed heat sinks maintain CPU, IOH, and Intel 7500 chip temperatures within thermal design targets
- Highly Optimized Fan Control Algorithm such as the following:
    - Base fan speeds are a function of hardware configuration and ambient temperature to minimize airflow for a given environment
    - PID control algorithms are used for both CPU and DIMMs to maintain appropriate thermal margin
    - Double refresh switching allows for DIMM temperature excursions up to 95°C while maintaining performance and thermal design targets as follows:
        - The M910 thermal algorithm monitors the thermal sensor on each DIMM to maintain DIMM temperatures below the typical 85°C specification in normal operating conditions.
        - Under extreme operating conditions, the thermal algorithm can switch the DIMMs into Double Refresh mode allowing an additional 10°C of thermal headroom. In Double Refresh mode, DIMMs are allowed to operate as high as 95°C.

5.4 Power Efficiency

One of the main features of blade servers is enhanced power efficiency. The PowerEdge M910 achieves higher power efficiency by implementing the following features:

- User-configurable power options via the M1000e Chassis Management Controller (CMC)
- Improved power budgeting
- Voltage Regulator efficiency improvements
- CPU VR dynamic phase shedding
- Switching regulators instead of linear regulators
- Closed loop thermal throttling
- Use of DDR3 memory (lower voltage compared to DDR2)
- Memory VR static phase shedding
- BIOS Power/Performance options page
- Active Power Controller (BIOS-based CPU P-state manager)
- Ability to throttle memory
- Ability to disable a CPU core
- Ability to turn off embedded NICs or PCIe lanes when not being used
- Energy Smart components at the M1000e chassis level to selectively enable more computing performance with less power consumption

6 Processors

6.1 Overview

The Intel Xeon processor 6500 and 7500 series 4S (Expandable Processor) is the microprocessor designed specifically for servers and workstation applications. The processor features quad-core processing to maximize performance and performance/watt for data center infrastructures and highly dense deployments. The Intel Xeon processor 6500 and 7500 series also features Intel® Core™ micro-architecture and Intel® 64 architecture for flexibility in 64-bit and 32-bit applications and operating systems. The Intel Xeon processor 6500 and 7500 series supports all Streaming SIMD Extensions (including SSE2, SSE3, and SSE4) and Intel 64 instruction.

The Intel Xeon processor 6500 and 7500 series 4S (Expandable Processor) uses a 1567-pins Land Grid Array (LGA1567) package that plugs into a surface-mount socket. The M910 provides support for two or four processors.

Table 5. Processor Cache Sizes (Package LGA1567)

Cache	Size
L1 cache size	32 KB instruction (32 KB data)
L2 cache size	1.5MB or 2MB
L3 cache size	12MB, 18MB or 24MB (shared)

6.2 Features

Key features of the Intel Xeon processor 6500 and 7500 series include:

- Up to eight cores per socket
- Up to 24MB shared L3 cache
- 45nm process technology
- Four full-width, bidirectional point-to-point Intel® QuickPath Interconnect (Intel® QPI) links at 6.4 GT/s
- Support for 95W, 105W, and 130W processors
- Four Intel® Scalable Memory Interconnects (Intel® SMI) at 6.4 GT/s
- Socket—LS, LGA 1567 package
- No termination required for non-populated CPUs (must populate CPU socket 1 first)
- Integrated Intel® QuickPath DDR3 memory controller
- 64-byte cache line size
- RISC/CISC hybrid architecture
- Compatible with existing x86 code base
- Optimized for 32-bit code
- MMX support
- Execute Disable Bit
- Intel® Wide Dynamic Execution
- Executes up to four instructions per clock cycle
- Simultaneous Multi-Threading (SMT) capability (2 threads/core)
- Support for CPU Turbo Mode (on certain SKUs)
- Increases CPU frequency if operating below thermal, power, and current limits
- Streaming SIMD (Single Instruction, Multiple Data) Extension 4

- Intel® 64 Technology
- Intel® VT-x and VT-d Technology for virtualization support
- Enhanced Intel® SpeedStep Technology
- Demand-based switching for active CPU power management as well as support for ACPI P-States, C-States, and T-States

6.3 Supported Processors

Table 6. Supported Processors

Model	Speed	TDP Power	Cache	Cores	QPI Speed
X7560	2.26GHz	130W	24M	8	6.4GT/s
X7542	2.66GHz	130W	18M	6	5.86GT/s
X6550	2.00GHz	130W	18M	8	6.4GT/s
E7540	2.00GHz	105W	18M	6	6.4GT/s
E6540	2.00GHz	105W	18M	6	6.4GT/s
E6510	1.73GHz	105W	12M	4	4.8GT/s
L7555	1.86GHz	95W	24M	8	5.86GT/s
L7545	1.86GHz	95W	18M	6	5.86GT/s
E7520	1.86GHz	95W	18M	4	4.8GT/s

6.4 Processor Configurations

The PowerEdge M910 is designed to support either a dual CPU configuration with FlexMem Bridge or a 4 CPU configuration. In either configuration, all IO and memory is available in the system. While not formally supported, single CPU configurations with a processor installed in CPU1 will allow the system to boot for diagnostic purposes.

The Intel Xeon processor 6500 series is for 2-socket configurations only and **cannot** be upgraded to a 4-socket configuration.

6.5 FlexMem Bridge

In a 4-CPU configuration, the PowerEdge M910 uses only one memory controller per CPU. This single controller connects to two memory buffers via Intel SMI links. Each memory buffer in turn connects to four DDR3 DIMMs. In a typical Intel Xeon processor 6500/7500 series configuration, only the

memory buffers associated with the two populated sockets would be connected, and therefore only 16 DIMMs would be accessible.

To overcome this limitation with 2 CPUs, the M910 uses the FlexMem Bridge which allows CPU1 and CPU2 to connect to the memory of their respective adjacent sockets (CPU3 and CPU4). The FlexMem Bridge provides the following:

- Two pass-through links for SMI
- One pass-through link for QPI

The pass-through SMI links connect the two installed CPU's to additional SMIs, therefore the CPU's will have the following memory attached:

- CPU1 will have access to DIMMs [A1:A8], plus DIMMs [C1:C8] (those normally associated with CPU3)
- CPU2 will have access to DIMMs [B1:B8], plus DIMMs [D1:D8] (those normally associated with CPU4)

The pass-through QPI link on the FlexMem Bridge provides increased performance for a 2P configuration because it allows 2 full-bandwidth QPI links between CPU1 and CPU2 as opposed to a single link. Figure 3 depicts the interconnection between the CPU sockets as well as connections internal to the FlexMem Bridges. The FlexMem Bridges are only supported in sockets 3 and 4.

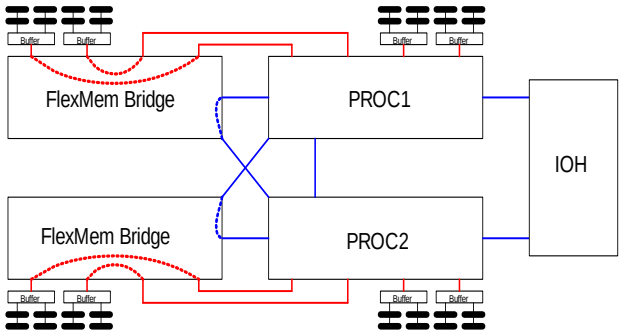


Figure 3. **Diagram of FlexMem Bridge Routing**

Modern processors are capable of tremendous workloads, and many types of utilization patterns such as virtualization often run into memory capacity issues well before the processors reach a saturation point. FlexMem Bridge technology was designed to assist those customers that have workloads that are memory intensive.

Customers who scale their workloads in the future to a point where they would need additional processing power can simply replace the FlexMem Bridge with additional processors to meet those needs.

Due to power limitations, the PowerEdge M910 will only support two X7560 (130W) processors. In an upgrade for a server with two 130W CPUs, the CPUs and the heatsink must be changed to the 95W or 105W CPUs. If the server has only the 95W or 105W CPUs, CPUs can simply be swapped out.

7 Memory

7.1 Overview

The PowerEdge M910 uses DDR3 memory providing a high-performance, high-speed memory interface capable of low latency response and high throughput. The PowerEdge M910 supports Registered ECC DDR3 DIMMs (RDIMM) only. Each DDR3 DIMM is driven by the Intel® 7500 Scalable Memory Buffer (Intel® 7500 SMB). A memory buffer has two DDR3 channels off it. Each of these channels can support up to 2 DIMMs running at 1067MHz (or slower) speeds. Intel® 7500 SMB will support single-, dual-, and quad-rank DIMMs. Up to four 2 GB, 4 GB, 8 GB, and 16 GB RDIMMs are supported per channel, for a total of up to 512 GB. Single-rank, dual rank, and quad-rank RDIMMs are supported. Across CPUs, DIMM populations can be different on the memory for each CPU as long as the population rules for each CPU socket are followed. Additionally, all CPU sockets operate in the same RAS mode and are set up with the same memory timing parameters.

4-socket platform capability (64 DIMMs):

- Up to 16 DDR3 DIMMs per socket through use of up to four Scalable Memory Buffers
- Support for up to 16GB DDR3 DIMMs
- 1TB with 16GB DIMMS

Memory types supported:

- 1066MHz DDR3 (800 & 1333MHz availability depends on OEM validation)
- Registered (RDIMM)
- Single-rank (SR), dual-rank (DR), quad-rank (QR)

Actual system memory speed depends on specific processor capabilities:

- 6.4GT/s SMI link speed capable of running memory speeds up to 1066Mhz
- 5.86GT/s SMI link speed capable of running memory speeds up to 978Mhz
- 4.8GT/s SMI link speed capable of running memory speeds up to 800Mhz

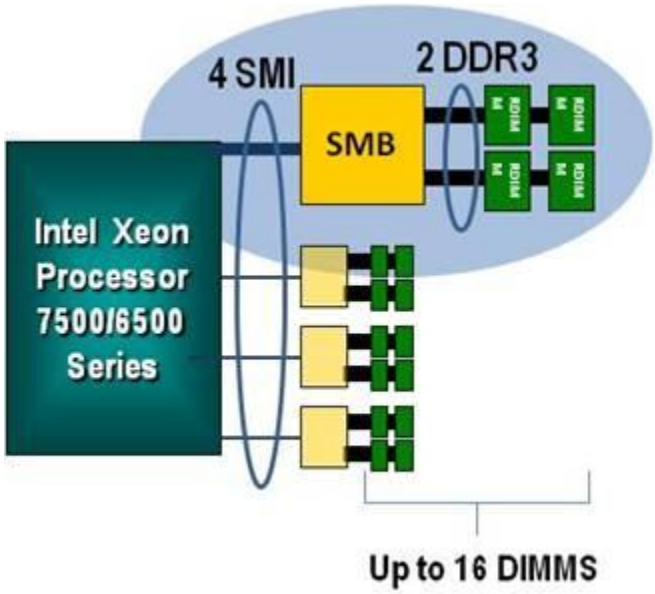


Figure 4. **Memory Diagram**

7.2 DIMMs Supported

If DIMMs of different speeds are mixed, all channels operate at the fastest common frequency. UDIMMs are not supported. The first DIMM slot in each channel is color-coded with white ejection tabs for ease of identification.

The M910's DIMM sockets are placed 0.40" apart, center-to-center, to provide enough space for sufficient airflow to cool stacked DIMMs. DIMMs must be installed in each channel starting with the DIMM farthest from the processor (DIMM 1). Population order is identified by silkscreen and a label. The order is dependent on the memory configuration used. See Table 8 for DIMM naming and population ordering.

7.3 Slots /Risers

For information, see System Memory in the *Dell PowerEdge Modular Systems Hardware Owner's Manual*.

7.4 Intel 7500 Scalable Memory Buffer (SMB)

The Intel 7500 SMB supports one Intel Scalable Memory Interconnect (Intel SMI), 2 DDR3 channels, and 1 SMBus slave interface at 100KHz. It does not support the repeater functionality. Target package size is 19.5mm x 24.5mm with 0.8 mm pitch. Intel SMI supports link speeds of 4.8, 5.86, and 6.4 GT/s with 11 Southbound lanes (9 data + 1 CRC + 1 spare) and 14 Northbound lanes (12 data + 1 CRC + 1 spare).

The DDR3 interface supports x4 and x8 single-rank, dual-rank, and quad-rank RDIMMs, and up to 2 RDIMMS per channel. Each DDR3 channel supports a maximum of 8 ranks. DDR3 speeds are 800, 978, and 1066 MHz. DRAM technology comes in 1 and 2Gb sizes. DIMM capacity is 1, 2, 4, 8, or 16GB (16GB with QR DIMMS only).

7.5 Memory RAS Support

The Intel Xeon processor 6500 and 7500 series supports high-availability memory modes including rank and DIMM sparing as well as memory mirroring. The M910 supports rank sparing only and mirroring as shown in Table 7.

Table 7. PowerEdge M910 Sparing and Mirroring

Sparing		Mirroring			
Type	**Rules enforced**	**1P**	**2P**	**4P**	**Rules Enforced**
Rank	The capacity of the spare rank must be greater than that of any other rank on the channel	No support	Inter-socket (hemisphere mode enabled)	Inter-socket	32 DIMM only, Mirrored must match

7.5.1 Sparing

For information, see System Memory in the *Dell PowerEdge Modular Systems Hardware Owner's Manual*.

7.5.2 Mirroring

For mirroring, the M910 will support 2P/4P configurations with 32 DIMMs only. When mirroring is enabled, only half of the physical memory will be visible to the system software. A full copy of the memory is maintained, and in the event of an uncorrectable error, the system will switch over to the mirrored copy. In 2P mode, the mirroring will be inter-node with hemisphere mode enabled. In this case, the memory controller (MBox) of CPU1 is mapped to the corresponding MBox of CPU2. The figure below depicts the mirroring logic for 2P configurations. A, B, C and D represent the DIMM socket groups.

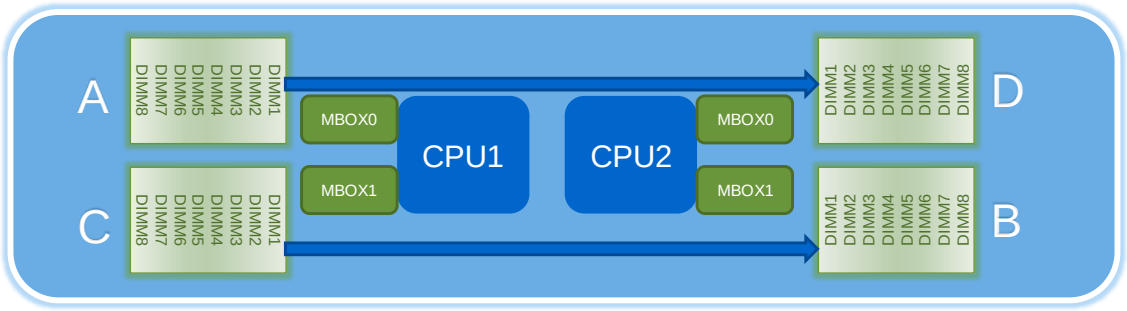


Figure 5. **PowerEdge M910 2P Mirroring**

For 4-processor configurations, the PowerEdge M910 will also support mirroring in the inter-socket mode (note that intra-socket is not possible in 4P because each CPU has only one MBox connected to memory buffers). In this 4P case, the memory on CPU1 will be mirrored with memory on CPU3, while memory on CPU2 is mirrored with memory on CPU4. Figure 6 depicts the mirroring logic for 2P configurations. A,B,C and D represent the DIMM socket groups.

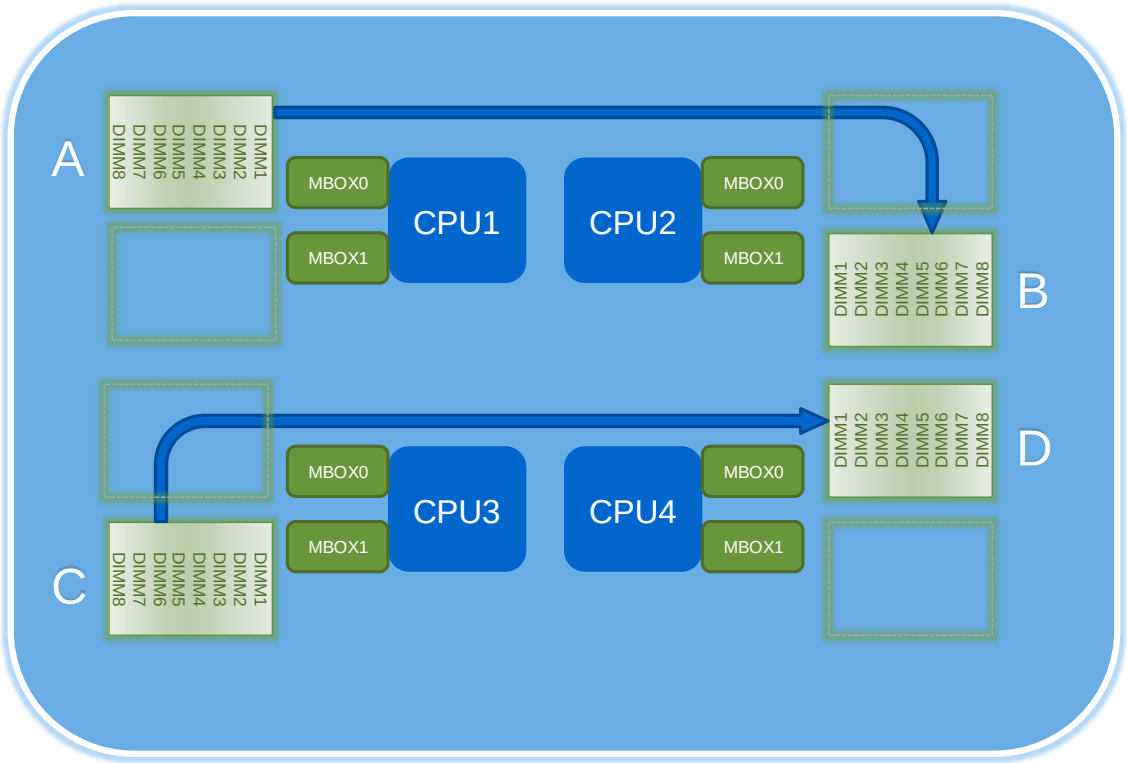


Figure 6. **M910 4P Mirroring**

7.5.3 Supported Memory Configurations

config #	Technology	DIMM Capacity	Qty of DIMMs	System Capacity	# of CPUs	Rank Sparing?	Mirror Support?	Memory Ranks
1	RDIMM	1 GB	4	4 GB	2	N	N	1
2	RDIMM	1 GB	8	8 GB	4	N	N	1
3	RDIMM	2 GB	8	16 GB	2 & 4	N	N	2
4	RDIMM	4 GB	8	32 GB	2 & 4	N	N	4
5	RDIMM	4 GB	24	96 GB	2 & 4	Y	N	4
6	RDIMM	4 GB	24	96 GB	2 & 4	Y	N	4
7	RDIMM	4 GB	32	128 GB	2 & 4	Y	Y	4
8	RDIMM	4 GB	32	128 GB	2 & 4	Y	Y	4
9	RDIMM	8 GB	16	128 GB	2 & 4	Y	N	4
10	RDIMM	8 GB	24	192 GB	2 & 4	Y	N	4
11	RDIMM	16x4GB + 16x8GB	32	192 GB	2 & 4	Y	Y	4
12	RDIMM	8 GB	32	256 GB	2 & 4	Y	Y	4
13	RDIMM	24x4GB + 8x8GB	32	160GB	2 & 4	Y	Y	4
14	RDIMM	16GB	8	128GB	2 & 4	Y	N	4
15	RDIMM	16GB	16	256GB	2 & 4	Y	N	4
16	RDIMM	16GB	32	512GB	2 & 4	Y	Y	4
17	RDIMM	4GB	16	64GB	2 & 4	Y	N	4
18	RDIMM	16x8GB + 16x16GB	32	384GB	2 & 4	Y	Y	4
19	RDIMM	1GB	2	2GB	2 & 4	Y	Y	1

Table 8. Supported Memory Configurations

8 Chipset

The PowerEdge M910 system board incorporates the Intel® 7500 chipset for I/O and processor interfacing. The 7500 chipset is designed to support Intel® Xeon® processor 6500 and 7500 series 4S family, Intel® QPI Interconnect, DDR3 memory technology, and PCI Express Generation 2 (PCIe 2). The 7500 chipset consists of the IOH QuickPath Interconnect (QPI), Intel® 7500 Scalable Memory Buffer, and the ICH10 South Bridge.

8.1 Intel 7500 I/O Hub (IOH)

The PowerEdge M910 system board incorporates an Intel 7500 series IOH to provide a link between the 4S processors and the I/O components. The main components of the IOH consist of two full-width QPI links (one to each processor), 36 lanes of PCIe Gen2, and a x4 DMI link to connect directly to the ICH10 (Intel I/O Controller Hub 10) South Bridge.

8.2 IOH QuickPath Interconnect (QPI)

The QPI architecture consists of serial point-to-point interconnects for the processors and the IOH. The PowerEdge M910 has a total of four QPI links including one link connecting the processors and links connecting both processors with the IOH. Each link consists of 20 lanes (full-width) in each direction with a link speed of 6.4 GT/s. An additional lane is reserved for a forwarded clock. Data is sent over the QPI links as packets.

The QPI architecture features the following four layers:

- The **Physical** layer consists of the actual connection between components. It supports Polarity Inversion and Lane Reversal for optimizing component placement and routing.
- The **Link** layer is responsible for flow control and the reliable transmission of data.
- The **Routing** layer is responsible for the routing of QPI data packets.
- Finally, the **Protocol** layer is responsible for high-level protocol communications, including the implementation of a MESIF (Modify, Exclusive, Shared, Invalid, Forward) cache coherence protocol.

8.3 PCI EXPRESS GENERATION 2

PCI Express (PCIe) is a serial point-to-point interconnect for I/O devices. PCIe Gen2 doubles the signaling bit rate of each lane from 2.5 Gb/s to 5 Gb/s. Each of the PCIe Gen2 ports is backward-compatible with Gen1 transfer rates.

8.4 Direct Media Interface (DMI)

The DMI (previously called the Enterprise Southbridge Interface) connects the Intel 7500 Legacy IOH with the Intel I/O Controller Hub (ICH). The DMI is equivalent to a x4 PCIe Gen1 link with a transfer rate of 1 GB/s in each direction.

8.5 Intel I/O Controller Hub 10 (ICH10)

ICH10 is a highly integrated I/O controller, supporting the following functions:

- Six x1 PCIe Gen1 ports, with the capability of combining ports 1–4 as a x4 link
- PCI Bus 32-bit Interface Rev 2.3 running at 33 MHz
- Six UHCI and two EHCI (High-Speed 2.0) USB host controllers, with up to twelve USB ports

- M910 has three external USB ports and one internal ports dedicated for UIPS/RIPS and embedded storage
- Power management interface (ACPI 3.0b compliant)
- Platform Environmental Control Interface (PECI)
- Intel® Dynamic Power Mode Manager
- I/O interrupt controller
- SMBus 2.0 controller
- Low Pin Count (LPC) interface to Super I/O, Trusted Platform Module (TPM), and SuperVU
- Serial Peripheral Interface (SPI) support for up to two devices
    - M910 BIOS flash device is connected to the ICH10 using SPI

8.6 PCI Express Mezzanine Connectors

The M910 supports four PCI Express Gen 2 x8 mezzanine connectors. There are no restrictions on mezzanine cards in the M910 (i.e., size or location).

9 BIOS

9.1 Overview

The PowerEdge M910 BIOS is based on the Dell BIOS core, and supports the following features:

- IA-32 Intel Xeon 7500 chipset 4S
- Simultaneous Multi-Threading (SMT)
- CPU Turbo Mode
- PCI 2.3
- Plug n' Play 1.0a
- MP (Multiprocessor) 1.4
- Boot from hard drive, optical drive, iSCSI drive, USB key, and SD card
- ACPI
- Direct Media Interface (DMI)
- PXE and WOL support for on-board NICs
- Memory mirroring and sparing
- SETUP access through <F2> key at end of POST
- USB 2.0 (USB boot code is 1.1 compliant)
- F1/F2 error logging in CMOS
- Virtual KVM, CD
- UEFI (Unified Extensible Firmware Interface) 2.1 support

The PowerEdge M910 BIOS does **not** support the following:

- Embedded Diagnostics
- BIOS language localization
- BIOS recovery after bad flash (but can be recovered from iDRAC6 Enterprise)

9.2 Supported ACPI States

The PowerEdge M910 supports the standard ACPI states. See http://www.acpi.info/for more information.

10 Embedded Gigabit Ethernet Controllers on Motherboard (LOM)

Two embedded Broadcom® 5709S dual-port LAN controllers are on the PowerEdge M910 system board as independent Gigabit Ethernet interface devices. The following information details the features of the LAN devices:

- X2 PCI Express Gen2 capable interface
- M910 operates this controller at Gen2 speed
- Integrated MAC and PHY
- 3072x18 Byte context memory
- 64 KB receive buffer
- TOE (TCP Offload Engine)
- iSCSI controller
- NC-SI (Network Controller-Sideband Interface) connection for Flex Addressing
- Wake-On-LAN (WOL)
- PXE 2.0 remote boot
- iSCSI boot
- IPv4 and IPv6 support
- Bare metal deployment support

11 I/O Mezzanine Card Options

11.1 Overview

The M910 contains four PCIe Gen2 mezzanine slots. Installation of mezzanine cards requires an M1000e I/O Module (IOM) of the same fabric technology to be installed in the corresponding fabric slot of the mezzanine to support data flow through that fabric/slot.

For more information, refer to the *PowerEdge M1000e Technical Guide*.

11.2 Options

Available options for all 4 slots include:

- Mellanox® QDR ConnectX™ Dual-Port Quad Data Rate (QDR) InfiniBand
- Broadcom® BCM57711 Dual Port KX4 MC (10G)
- Broadcom® BCM5709S Dual Port SERDES
- Broadcom® BCM5709S Quad Prot SERDES
- Intel® Dual Port 10G KX4 MC
- Intel® Quad Port 1G SERDES MC
- Dual Port FC8 Qlogic® QME2572
- Dual Port FC8 Emulex® LPe1205-M
- Qlogic® CNA QME8142 (10Gb Enhanced Ethernet + FCoE)
- Emulex® CNA OCM20102FM (10Gb Enhanced Ethernet)
- Intel® 52599 (10Gb Enhanced Ethernet)

12 Storage

12.1 Drives

The PowerEdge M910 supports up to two 2.5” SAS hard disk drives.

- 2.5" SAS (10K rpm): 146GB, or 300GB
- 2.5" SAS (15K rpm): 73GB or 146GB
- 2.5” SAS (7.2k rpm): 500GB
- 2.5” SSD: 50GB or 100GB

12.2 Hard Disk Drive Carriers

The PowerEdge M910 supports the 11G 2.5” hard drive carrier. Legacy carriers are not supported on M910.

Figure 7. **2.5” HDD Carrier**

12.3 Empty Drive Bays

For the slots that are not occupied by drives, a carrier blank is provided to maintain proper cooling, maintain a uniform appearance to the unit, and provide EMI shielding.

12.4 Diskless Configuration Support

The system supports diskless configuration with no storage controller (H200/PERC 7i) installed in the system. A 2.5” HDD backplane is installed in this configuration.

12.5 RAID Configurations

Table 9. RAID Configurations

	Hot Plug	Min HDs	Max HDs	Configs	Description	Factory
0	N	0	0	ZERO	Diskless Configuration, No daughtercard	√
1	N	1	2	ASSN	SAS drives using SAS6/IR or H200 daughtercard with no RAID	√
2	N	2	2	ASSR0	SAS drives using the SAS6/IR or H200 daughtercard with drives in a RAID 0 mirror	√
3	Y	2	2	ASSR1	SAS drives using the SAS6/IR or H200 daughtercard with drives in a RAID 1 Stripe	√
4	N	2	2	ASSCBR0	SAS or Solid State drives using the PERC6 or H700 daughtercard (w/ battery) with drives in a RAID 0 Stripe	√
5	Y	2	2	ASSCBR1	SAS or Solid State drives using the PERC6 or H700 daughtercard (w/ battery) with drives in a RAID 1 mirror	√

12.6 Storage Controllers

Table 10. Storage Controllers Supported on the M910

	SKU Product	Usage	M910	Slot	PCIe Con	PCI Bracket	I/O Con	RAID	BBU
SAS HBA SAS/SATA	PERC H200 Integrated	Internal Backplane Storage	Yes – Max 1	Storage slot	X4	No	x4 integrated mini SAS wide	0, 1, 10	No

12.6.1 SATA Repeater

The M910 does not support the SATA repeater. The only SATA drives supported by M910 are the SSD drives which are only supported off the PERC solution.

12.6.2 PERC6/i

For customers who want a hardware RAID solution, the PERC6i is available as an optional customer kit. The PERC6i uses the LSI 1078 ROC (RAID on Chip) processor with a PCI Express host interface and DDR2 memory. A battery is available with this card.

12.6.3 PERC H200

The M910 supports the PERC H200, which offers a battery-backed cache. Details of the PERC H200 can be found in the PERC H200 Technical Guidebook.

12.6.4 PERC H700

The M910 also supports the PERC H700. Details of the PERC H700 can be found in the PERC H700 Technical Guidebook. It offers a battery-backed cache.

12.7 LED Indicators

Each disk drive carrier has two LED indicators visible from the front of the system. One is a green LED for disk activity and the other is a bicolor (Green/Amber) LED for status. Both LEDs are used to indicate certain conditions under direction of a storage controller.

12.8 Optical Drives

Optical drives are optional in all M910 systems and connect to the blade via the front USB interface. The following internal slim-line drives are available on the M910:

- DVD-ROM
- DVD+RW

PATA (IDE) optical drives are not supported.

13 Video (PCI Video)

The PowerEdge M910 Integrated Dell Remote Access Controller 6 (iDRAC6) incorporates an integrated video subsystem connected to the 32-bit PCI interface of the ICH10. This logic is based on the Matrox® G200. The device only supports 2D graphics.

The integrated video core shares its video memory with the iDRAC6's 128 MB DDR2 application space memory. This memory is also used for the KVM buffer.

The M910 system supports the following 2D graphics video modes:

Table 11. Supported Video Modes

Resolution	Refresh Rate (Hz)	Color Depth (bit)
640 x 480	60, 72, 75, 85	8, 16, 32
800 x 600	56, 60, 72, 75, 85	8, 16, 32
1024 x 768	60, 72, 75, 85	8, 16, 32
1152 x 864	75	8, 16, 32
1280 x 1024	60, 75, 85	8, 16
1280 x 1024	60	32

14 Rack Information

For information on rack and cable accessories for the M910, see the *PowerEdge M1000e Technical Guide* and the M1000e Rack and Cable Advisor Tool.

15 Operating Systems

The PowerEdge M910 is designed to meet the MSFT WinLogo 3.0 design specifications. For the most up-to-date information, see the Operating System Support Matrix for Dell PowerEdge Systems on Dell.com.

16 Virtualization

16.1 Overview

Table 12. Virtualization Software

Hypervisor	Factory Install	Certification
VMware® ESX/ESXi™ 3.5U5	DIB/FI/NFI	Yes
VMware® ESX/ESXi™ 4.0U1	DIB/FI/NFI	Yes
Windows Server® 2008 R2 with Hyper-V™	FI	Yes, included in Windows Server 2008 R2 WHQL process
Citrix® XenServer™ 5.6	FI	Yes

Support.dell.com has extensive information designed to help customers configure virtualization software with PowerEdge servers.

To configure a complete virtualization solution, another resource is the Dell Virtualization Solution Advisor on dell.com. Support.dell.com also has many blade-related virtualization documents, as well as a detailed list of the virtualization platforms that are supported by OpenManage.

For information about what versions of VMware software have been certified on this server, see the compatibility list maintained by VMware.

It is possible to order the server with an SD card that does not contain ESXi.

16.2 Advanced Infrastructure Manager by Scalent

Dell Advanced Infrastructure Manager (AIM) allows IT organizations to manage networking, storage, and servers (as well as server workloads) that can be dynamically reconfigured and deployed to meet the changing needs of today's data center environment. Specifically, AIM provides IT professionals the ability to:

- Combine new and existing networking, storage devices, and servers into a holistic computing solution that enables dynamic allocation of resources to meet application workload requirements.
- Manage physical and virtual resources with a single solution that includes the ability to move workloads seamlessly across hardware platforms for increased availability and scalability.
- Provide virtualization-like functionality to non-virtual (physical) servers, including automated failover, dynamic load balancing, and business continuity.
- Integrate existing infrastructure (networking, storage devices, and servers) into an AIM solution to provide investment protection and extend the useful life of existing data center assets.
- Significantly decrease the amount of time and people required to deploy hardware and get applications up and running by providing a repeatable, scalable framework for hardware implementation using AIM.

Dell

The following platforms have been certified by Scalent:

- Nov 2009: 2970, R610, R710, M1000E, 1955, M605, M610, M710, and M905.
- April 2010: R810, R815, R910, and M910.

More information can be found at www.dell.com/aim .

16.3 Vizioncore

Vizioncore's easy-to-use virtualization software products support business continuity and disaster recovery, high availability, monitoring, automation, P2V and optimization. The software is agent-less and can co-exist with other leading backup software vendors, or be used as a standalone solution.

- vRanger™ Pro is a backup and restore solution for virtualized environments.
- vFoglight™ Standard and Professional editions help organizations monitor, understand and analyze their virtual infrastructure by managing the relationships and interaction between all the components in the virtual environment.
- vConverter™ helps convert servers to the VMware, Microsoft, XenServer or Virtual Iron platforms.
- vReplicator is a host-level software-based replication solution for VMware infrastructure which enables companies to leverage virtualization to support High Availability (HA) and Disaster Recovery (DR) strategies.
- Vizioncore™ vOptimizer Pro helps administrators understand storage utilization so they can make real-time adjustments in allocations. It presents the financial impact of reclaimed storage per virtual machine (VM), per host, and cumulative cost savings across the enterprise through historical detailed reports.
- vControl is a VM management solution that provides self-service provisioning, multi-VM control and task-based automation. vControl lets VM consumers build and deploy VMs for themselves, while providing administrators a single interface for task-based administration of VMs.
- Vizioncore vEssentials™ is a software bundle of vFoglight Pro, vRanger Pro and vReplicator.

More information can be found at http://vizioncore.com/asg/.

17 Systems Management

17.1 Overview

Dell aims on delivering open, flexible, and integrated solutions that help you reduce the complexity of managing disparate IT assets by building comprehensive IT management solutions. Combining Dell PowerEdge Servers with a wide selection of Dell-developed management solutions gives you choice and flexibility, so you can simplify and save in environments of any size. To help you meet your server performance demands, Dell offers Dell™ OpenManage™ systems management solutions for:

- Deployment of one or many servers from a single console
- Monitoring of server and storage health and maintenance
- Update of system, operating system, and application software

Dell offers IT management solutions for organizations of all sizes—priced, sized, and supported right.

17.2 Server Management

A Dell Systems Management and Documentation DVD and a Dell Management Console DVD are included with the product. ISO images are also available. A brief description of available content:

- Dell Systems Build and Update Utility: Dell Systems Build and Update Utility assists in OS install and pre-OS hardware configuration and updates.
- OpenManage Server Administrator: The OpenManage Server Administrator (OMSA) tool provides a comprehensive, one-to-one systems management solution, designed for system administrators to manage systems locally and remotely on a network. OMSA allows system administrators to focus on managing their entire network by providing comprehensive one-to-one systems management.
- Management Console: Our legacy IT Assistant console is also included, as well as tools to allow access to our remote management products. These tools are Remote Access Service, for iDRAC, and the BMC Management Utility.
- Active Directory Snap-in Utility: The Active Directory Snap-in Utility provides an extension snap-in to the Microsoft Active Directory. This allows you to manage Dell specific Active Directory objects. The Dell-specific schema class definitions and their installation are also included on the DVD.
- Dell Systems Service Diagnostics Tools: Dell Systems Service and Diagnostics tools deliver the latest Dell optimized drivers, utilities, and operating system-based diagnostics that you can use to update your system.
- eDocs: The section includes files for PowerEdge systems, storage peripheral, and OpenManage software.
- Dell Management Console DVD: The Dell Management Console is a Web-based systems management software that enables you to discover and inventory devices on your network. It also provides advanced functions, such as health and performance monitoring of networked devices and patch management capabilities for Dell systems.
- Server Update Utility: In addition to the Systems Management Tools and Documentation and Dell Management Console DVDs, customers have the option to obtain Server Update Utility DVD. This DVD has an inventory tool for managing updates to firmware, BIOS and drivers for either Linux or Windows varieties.

17.3 Embedded Server Management

The PowerEdge M910 implements circuitry for the next generation of Embedded Server Management. It is Intelligent Platform Management Interface (IPMI) v2.0 compliant. The optional iDRAC (Integrated Dell Remote Access Controller) is responsible for acting as an interface between the host system and its management software and the periphery devices.

The optional upgrade to iDRAC6 provides features for managing the server remotely or in data center lights-out environments.

Advanced iDRAC features require the installation of the optional iDRAC6 Enterprise card.

17.4 Lifecycle Controller and Unified Server Configurator

Embedded management is comprised of several interdependent pieces:

- Lifecycle Controller
- Unified Server Configurator
- iDRAC6
- vFlash

Lifecycle controller powers the embedded management features. It is integrated and tamperproof storage for system-management tools and enablement utilities (firmware, drivers, etc.). It is flash partitioned to support multiple, future-use cases.

Dell Unified Server Configurator (USC) is a local 1:1 graphical user interface embedded on Lifecycle Controller that aids in local server provisioning in a pre-OS environment. For servers with iDRAC Express, the Lifecycle Controller offers OS install, platform updates, platform configuration, and diagnostics capabilities. For servers without iDRAC Express, this utility has limited functionality and offers OS install and diagnostics capabilities only.

To access the Unified Server Configurator, press the <F10> key within 10 seconds of the Dell logo's appearance during the system boot process. Current functionality enabled by the Unified Server Configurator includes:

Table 13. Unified Server Configurator Features and Description

Feature	Description
Faster O/S Installation	Drivers and the installation utility are embedded on system, so no need to scour DELL.COM.
Faster System Updates	Integration with Dell support automatically directed to latest versions of the Unified Server Configurator, iDRAC, RAID, BIOS, NIC, and Power Supply.
Update Rollback	Ability to recover to previous "known good state" for all updatable components.
More Comprehensive Diagnostics	Diagnostic utilities are embedded on system.
Simplified Hardware Configuration	Detects RAID controller and allows user to configure virtual disk and choose virtual disk as boot device, eliminating the need to launch a separate utility. Also provides configuration for iDRAC, BIOS, and NIC/LOM.

17.5 The iDRAC6 Enterprise

In addition to upgrading the system with a Lifecycle Controller, the iDRAC6 offers the following key features:

- Graphical web interface
- Standard-based interfaces
- Server Sensor monitoring and fault alerting
- Secure operation of remote access functions including authentication, authorization, and encryption
- Power control and management with the ability to limit server power consumption and remotely control server power states
- Advanced troubleshooting capabilities
- Scripting capability with Dell's Racadm command-line
- Remote video, keyboard, and mouse (KVM) control with Virtual Console
- Remote media access with Virtual Media
- Dedicated network interface

Additionally, the iDRAC6 can be upgraded by adding the vFlash Media card. This is a 1 GB Dell branded SD card that enables a persistent 256 MB virtual flash partition.

A more detailed feature list for iDRAC6 and vFlash is included in the table below.

Table 14. Features List for BMC, iDrac, and vFlash

Feature	BMC	iDRAC6 Enterprise	vFlash Media
IPMI 2.0	✓	✓	✓
Web-based GUI		✓	✓
SNMP		✓	✓
WSMAN		✓	✓
SMASH-CLP		✓	✓
Racadm command-line		✓	✓
Shared/Failover Network Modes	✓	✓	✓
IPv4	✓	✓	✓
VLAN Tagging	✓	✓	✓
IPv6		✓	✓
Dynamic DNS		✓	✓
Dedicated NIC		✓	✓
Role-based Authority	✓	✓	✓
Local Users	✓	✓	✓
Active Directory		✓	✓
SSL Encryption		✓	✓
Remote Firmware Update	✓	✓	✓

Feature	BMC	iDRAC6 Enterprise	vFlash Media
Server power control	✓	✓	✓
Serial-over-LAN (with proxy)	✓	✓	✓
Serial-over-LAN (no proxy)		✓	✓
Power capping		✓	✓
Last crash screen capture		✓	✓
Boot capture		✓	✓
Serial-over-LAN		✓	✓
Virtual media		✓	✓
Virtual console		✓	✓
Virtual console sharing		✓	✓
Virtual flash			✓
Sensor Monitoring and Alerting	✓	✓	✓
Real-time Power Monitoring		✓	✓
Real-time Power Graphing		✓	✓
Historical Power Counters		✓	✓
System Event Log	✓	✓	✓
RAC Log		✓	✓
Trace Log		✓	✓

17.6 Chassis Management Controller (CMC)

See the *PowerEdge M1000e Technical Guide*.

18 Peripherals

18.1 USB peripherals

The PowerEdge M910 provides an internal USB connector for a USB flash memory key. The USB memory key can be used as a boot device, security key, or mass storage device.

18.2 External Storage

By use of the appropriate IOMs in the M1000e chassis and mezzanine card(s) in the M910 blade, the following external storage options are available:

Disk Storage Options:

- Dell/EqualLogic™ PSSeries
- PowerVault™ NX Series
- PowerVault MD3000i

Dell/EMC products:

- Dell/EMC fibre channel and/or iSCSI external storage, including Dell/EMC CX Series, AX Series, and NS Series

Appendix A. Regulatory Certifications and Standards Compliance

Please see the external Product Safety, EMC, and Environmental Datasheets on dell.com at: http://www.dell.com/regulatory_compliance_datasheets

The M910 systems conform to the industry standards shown in Table 15.

Table 15. Industry Standards and URLs

Standard	URL for information and specifications
ACPI Advance Configuration and Power Interface Specification, v2.0c	http://www.acpi.info/
Ethernet IEEE 802.3-2005	http://standards.ieee.org/getieee802/802.3.html
IPMI Intelligent Platform Management Interface, v2.0	http://www.intel.com/design/servers/ipmi/
DDR3 Memory DDR3 SDRAM Specification, Rev. 3A	http://www.jedec.org/download/search/JESD79-3A.pdf
LPC Low Pin Count Interface Specification, Rev. 1.1	http://developer.intel.com/design/chipsets/industry/lpc.htm
PCI Express PCI Express Base Specification Rev. 2.0	http://www.pcisig.com/specifications/pciexpress/
PMBus Power System Management Protocol Specification, v1.1	http://pmbus.info/specs.html
SAS Serial Attached SCSI, v1.1	http://www.t10.org/ftp/t10/drafts/sas1/sas1r10.pdf
SATA Serial ATA Rev. 2.6; SATA II, Extensions to SATA 1.0a, Rev. 1.2	https://www.sata-io.org/secure/spec_download.asp http://www.sata-io.org/docs/S2Ext_1_2_Gold.pdf
SMBIOS System Management BIOS Reference Specification, v2.6	http://www.dmtf.org/standards/smbios/
TPM Trusted Platform Module Specification, v1.2	https://www.trustedcomputinggroup.org/downloads/specifications/tpm/tpm
UEFI Unified Extensible Firmware Interface Specification, v2.1	http://www.uefi.org/specs/

Standard	URL for information and specifications
USB Universal Serial Bus Specification, Rev. 2.0	http://www.usb.org/developers/docs/
Windows Logo Windows Logo Program System and Device Requirements, v3.10	http://www.microsoft.com/whdc/winlogo/hwrequirements.mspx